

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN RE APPLICATION OF: Ryu OGAWARA

SERIAL NO: New Application

GAU:

FILED: Herewith

EXAMINER:

FOR: PHASE-CHANGE MEMORY DEVICE USING CHALCOGENIDE COMPOUND AS THE MATERIAL OF  
MEMORY CELLS

**INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97**

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

Applicant(s) wish to disclose the following information.

**REFERENCES**

- The applicant(s) wish to make of record the references listed on the attached form PTO-1449. Copies of the listed references are attached, where required, as are either statements of relevancy or any readily available English translations of pertinent portions of any non-English language references.
- A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

**RELATED CASES**

- Attached is a list of applicant's pending application(s) or issued patent(s) which may be related to the present application. A copy of the patent(s), together with a copy of the claims and drawings of the pending application(s) is attached along with PTO 1449.
- A check or credit card payment form is attached in the amount required under 37 CFR §1.17(p).

**CERTIFICATION**

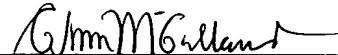
- Each item of information contained in this information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement.
- No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned, having made reasonable inquiry, was known to any individual designated in 37 CFR §1.56(c) more than three months prior to the filing of this statement.

**DEPOSIT ACCOUNT**

- Please charge any additional fees for the papers being filed herewith and for which no check or credit card payment is enclosed herewith, or credit any overpayment to deposit account number 15-0030. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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**STATEMENT OF RELEVANCY**

**Reference AW of Form PTO-1449:**

An electrically reprogrammable resistor approach has been developed as a basis for a new nonvolatile memory that is potentially denser, faster and easier to make than DRAM. It relies on structural phase transitions induced by nanosecond-scale heating and cooling of small volumes of chalcogenide films within the memory cell. Initial target markets include FLASH memory, embedded memory and DRAM.

**Reference AX of Form PTO-1449:**

Using 0.18  $\mu$ m 3V CMOS, cells from  $5F^2 \sim 8F^2$  are built in a charge-pump free 4Mb development vehicle. Direct overwrites, 10ms reset times.

**Reference AY of Form PTO-1449:**

180mm technology, high density, low voltage, high-speed programming, radiation resistance, block erase is unnecessary.

| Form PTO 1449<br>(Modified)  |    | U.S. DEPARTMENT OF COMMERCE<br>PATENT AND TRADEMARK OFFICE<br><br>LIST OF REFERENCES CITED BY APPLICANT   |      | ATTY DOCKET NO.<br>248861US2S |             | SERIAL NO.<br>New Application                                    |                            |
|--|----|---|------|-------------------------------|-------------|--|----------------------------|
|  |    |   |      | APPLICANT<br>Ryu OGIVARA      |             |  |                            |
|  |    |   |      | FILING DATE<br>Herewith       |             | GROUP  |                            |
|  |    | U.S. PATENT DOCUMENTS   |      |                               |             |  |                            |
| EXAMINER INITIAL   |    | DOCUMENT NUMBER   | DATE | NAME                          | CLASS       | SUB CLASS  | FILING DATE IF APPROPRIATE |
|  | AA |   |      |                               |             |  |                            |
|  | AB |   |      |                               |             |  |                            |
|  | AC |   |      |                               |             |  |                            |
|  | AD |   |      |                               |             |  |                            |
|  | AE |   |      |                               |             |  |                            |
|  | AF |   |      |                               |             |  |                            |
|  | AG |   |      |                               |             |  |                            |
|  | AH |   |      |                               |             |  |                            |
|  | AI |   |      |                               |             |  |                            |
|  | AJ |   |      |                               |             |  |                            |
|  | AK |   |      |                               |             |  |                            |
|  | AL |   |      |                               |             |  |                            |
|  | AM |   |      |                               |             |  |                            |
|  | AN |   |      |                               |             |  |                            |
| FOREIGN PATENT DOCUMENTS   |    |   |      |                               |             |  |                            |
|  |    | DOCUMENT NUMBER   | DATE | COUNTRY                       | TRANSLATION |  |                            |
|  |    |   |      |                               | YES         | NO   |                            |
|  | AO |   |      |                               |             |  |                            |
|  | AP |   |      |                               |             |  |                            |
|  | AQ |   |      |                               |             |  |                            |
|  | AR |   |      |                               |             |  |                            |
|  | AS |   |      |                               |             |  |                            |
|  | AT |   |      |                               |             |  |                            |
|  | AU |   |      |                               |             |  |                            |
|  | AV |   |      |                               |             |  |                            |
| OTHER REFERENCES (Including Author, Title, Date, Pertinent Pages, etc.)  |    |   |      |                               |             |  |                            |
|  | AW | Scott TYSON, et al., "NONVOLATILE, HIGH DENSITY, HIGH PERFORMANCE PHASE-CHANGE MEMORY", IEEE, 2000, pgs. 385 – 390.   |      |                               |             |  |                            |
|  | AX | Manzur GILL, et al., "OVONIC UNIFIED MEMORY – A HIGH-PERFORMANCE NONVOLATILE MEMORY TECHNOLOGY FOR STAND-ALONE MEMORY AND EMBEDDED APPLICATIONS", ISSCC 2002, Session 12, TD: Digital Directions / 12.4, 7 pages. |      |                               |             |  |                            |
|  | AY | Stefan LAI, et al., "OUM – A 180 nm NONVOLATILE MEMORY CELL ELEMENT TECHNOLOGY FOR STAND ALONE AND EMBEDDED APPLICATIONS" IEEE, 2001, IEDM, pgs. 803 – 806.   |      |                               |             |  |                            |
|  | AZ |   |      |                               |             | <input type="checkbox"/> Additional References sheet(s) attached |                            |
| Examiner   |    |   |      | Date Considered               |             |  |                            |
| *Examiner: Initial if reference is considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. |    |   |      |                               |             |  |                            |